

# QTC



September 2021

## What's the best wire for a dipole?

**Update: 2x1 Contest Callsigns**  
**Hotspots: what are they?**  
**Antennas for small blocks: Part 2**  
**More QRM stories from the field**

**Coming up.... Antennapalooza,**  
**RASA's Open Forum and the**  
**Oceania DX Contest**

***...and more...***

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Cover picture credit: Ian VK3BUF

## *QTC from the Editorial Team*

**W**elcome to our September edition of QTC.

It's been a very busy few months in the world of RASA and Amateur Radio.

RASA held our Annual General Meeting earlier this month. Our new President, Paul Anslow VK2APA introduces himself and this is followed by a copy of our Annual Report for 2021.

Working collaboratively with the WIA continues to be a bit hit 'n miss. We've had good results with individuals who are open minded and only interested in progressing the hobby. Examples include:

- Bandplan reviews
- PLC Interference
- 2x1 contest callsign committee

Regrettably, the majority of the WIA Board continue to reject any efforts we make to build a bridge and work together for the good of all VK radio amateurs.

Ian VK3BUF and Chris VK3QB spent a day in the field, testing different antenna wires. The results may just surprise you.

Suburban building blocks are getting smaller, but that does not mean the end of HF. Paul VK2APA brings us the second in his series showing us some antennas designed for restricted spaces.

The ACMA's analysis and consideration of the Consultation processes continues. We've continued to provide them with advice and are hopeful that the 2x1 contest callsigns will be available soon.

Our most recent followup with ACMA was earlier this week... read more in this edition.

QRM Guru continues to assist amateurs around the world resolve their interference issues. We've got a few more small stories that we hope will motivate you to get involved in *killing your QRM!*

Sadly, PerthTech has been postponed, but the raffle will still go ahead. Read more news and buy your raffle tickets [here](#).

Antennapalooza is back this year (we hope so, anyway). You can read about it in this issue.

Our Open Forum is scheduled for the 9<sup>th</sup> October. Details will follow closer to the event.

And don't forget the Oceania DX Contest is coming up. SSB on 2<sup>nd</sup> October and CW on 9<sup>th</sup> October. For more info visit the website [here](#).

We hope you enjoy this issue of QTC... as always, we welcome your feedback and ideas.

73,

QTC Editorial Team  
[info@vkradioamateurs.org](mailto:info@vkradioamateurs.org)



## RASA's Open Forum

It's that time of year again.

The annual RASA Open Forum will be held via Zoom – just like last year. Note down the date and time on your diary:

**9<sup>th</sup> October 2021 at 0100UTC**

Hopefully this time works well for those in Perth as those of us in VK1, 2 and 3 will have gone with day-light savings time.

Once again, the forum will be your opportunity to hear about what we're doing, our priorities for 2021/2022 and, most importantly, share your ideas and ask us questions.

Watch your email a little closer to the date and we'll send the Zoom details. Please ensure you post your name and callsign when you join the online conference.

If you have any questions, or topics you'd like to see covered, please send us an email.

[info@vkradioamateurs.org](mailto:info@vkradioamateurs.org)

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## RASA Membership



**W**e believe we should be measured by our achievements. And we can only succeed with your support, so thanks to all our members and supporters for helping us make this happen.

And thanks to everyone who has sent us emails with feedback.

We listen to our members and respond to emails and questions about our initiatives, policies and priorities.

Please support us by joining or renewing your membership today. It's just \$10 and its simple – [follow this link](#).

We have heard from a number of members who are not receiving our bulletins or emails.

Some of you are overdue with your annual membership fees.

Please drop us an email if you're not sure if you're membership is up-to-date and we'll get back to you.

Also, please check your spam or junk folders; some ISPs and mail clients are very aggressive with how they categorise incoming emails.

### QRM Kill Kits

Ferrite kits to suppress unwanted noise in your shack. Click the image to head to our online shop.



Build a simple DF Loop to help you localise and pinpoint the source of the noise. Click on the image to head to our online shop.





## *The ethos and ethics of Amateur Radio*

Like many hobbies, Amateur Radio has traditions, jargon and practices that are not always apparent to the newcomer. Your licence entitles you to get on the air and transmit, but, as a newcomer, you need to familiarise yourself with the way the hobby works operationally before transmitting.

Getting to know how amateur radio stations operate will provide a smooth and stress-free entry to this great hobby of ours.

Have a listen around the bands before you first transmit (if you haven't already) – monitor typical amateur QSOs (conversations). This will give you a feel for on air practices.

Once you start transmitting, steer well clear of controversial topics including:

- religion;
- politics;
- business (you can talk about your profession/trade, but you cannot advertise your services or those of anyone else);
- derogatory remarks/observations/jokes directed at any group (gender, ethnic, religious, political, sexual orientation, etc.); and
- off-colour humour.

Above all, apply common sense and good taste.

Do NOT use CB jargon – you will annoy your fellow amateurs and will be ostracised at best or roundly criticised on air at worst... Amateur and CB radio are different hobbies, with different operating practices. This hobby has many participants with as many differing views.

Remember, you are also prohibited from transmitting any form of entertainment.

The American Radio Relay League has, for many years, published a guide for new amateurs, known as The Amateurs Code:

The Radio Amateur is:

**CONSIDERATE**...He/she never knowingly operates in such a way as to lessen the pleasure of others.

**LOYAL**...He/She offers loyalty, encouragement and support to other amateurs.

**PROGRESSIVE**...He/She keeps his/her station up to date. It is well-built and efficient. His/Her operating practice is above reproach.

**FRIENDLY**...He/She operates slowly and patiently when requested; offers friendly advice and counsel to beginners; kind assistance, cooperation and consideration for the interests of others. These are the marks of the amateur spirit.

**BALANCED**.... Radio is a hobby, never interfering with duties owed to family, job, school or community.

(adapted from the original Amateur's Code, written by Paul M. Segal, W9EEA, in 1928)

*RASA supports and promotes this ethos and ethics code.*

## *ACMA and Regulations*



The ACMA continue their review of the consultation process. As at the time of publication (29 September) we don't have any further information to share with readers.

However, RASA continues to ensure focus on the following areas:

### ***Protection from Interference***

RASA is the only national body that is actively working here in Australia to protect our bands from interference. We lobby ACMA to ensure our interference protection rights under the Radiocommunications Act are retained, and we promote the benefits of QRM Guru to ACMA officers. We have informal feedback that QRM Guru is widely regarded as a practical and useful tool to aid in achieving these objectives.

We know that ACMA is more responsive to complaints that are supported with evidence and a properly documented submission. QRM Guru provides the framework for such submissions.

On the ground we continue to assist amateurs to hunt down and resolve local QRM issues. We present to clubs regularly and constantly seek feedback from fellow amateurs.

### ***Repeater and Beacon Assignments***

Existing legacy arrangements are out-dated, inefficient, painfully slow and exhibit single points of failure. There are no performance management regimes, and we are aware of numerous complaints from clubs and individuals.

RASA has proposed a more equitable, transparent, and responsive service as a part of the recent consultation process with ACMA.

### ***50-54MHz for Standard Class Licencees***

RASA continues to lobby the ACMA to have this anomaly addressed.

### ***1kW for Advanced Amateurs***

RASA continues to lobby ACMA to allow Advanced amateurs to use 1kW.

### ***2x1 Contest Callsigns***

On 27 September, ACMA advised RASA that they "*intend to make a public announcement (via the amateur e-bulletin) on 2x1 callsigns as soon as practicable*".

## 2x1 Contest Callsigns – a win for contesters!

The 2x1 Contest Callsign release by ACMA has been *in process* now since December 2018.

As many readers will recall, RASA convened a committee to investigate contest callsigns at the beginning of 2019. That committee was successful in working collaboratively to create a proposal for these unique callsigns.

What's even more notable is that this committee comprised members from RASA, the WIA and the VK Contest Club. All members worked together professionally and in a collegiate fashion.

RASA successfully negotiated these new callsigns with ACMA and they were added to the Callsign Template in July 2020.

We have continued to work closely with ACMA and advise them as they've worked through the recent Sector Consultation process.



VK2ZRH/4  
Source: qrz.com

Some may think two years is a long time... and we'd agree, but it's good to see WIA's **Amateur Radio** magazine editor, Mr Roger Harrison VK2ZRH/ port 4, acknowledge this important achievement.

Mr Harrison is also a former WIA Board member and is very well known in VK2 amateur circles.

Mr Harrison offers the following in his editorial:

Many readers will no doubt recall the recent ACMA consultation on 2x1 call signs. This has been a contentious issue for decades, going as far back as the mid-1990s WIA submission to government on amateur licensing that later led to the 2003 amateur licensing review and the introduction of the Foundation licence. Patterns of call sign construction and use were recognised and raised as an issue back then. The wheels of government grind ever slowly, but they do keep moving.

I understand that there has been quite a strong response from the amateur fraternity to this latest ACMA consultation and many amateurs are waiting with bated breath to read the regulator's response. That said, there are also many amateurs who could not give a hoot about the subject, let alone any response from our regulator.

(Source: AR Magazine, Vol 89)

It is unfortunate Mr Harrison has neglected to point out just how quickly the 2x1 Contest Callsign matter has progressed and that they were authorised by ACMA in July 2020.

We have written to Mr Harrison asking that he correct the record and acknowledge the outstanding work done by the cross-sector committee, including members from RASA and the WIA.

<https://vkradioamateurs.org/acma-approve-2-x-1-contest-callsigns/>

At the time of publication, we haven't yet received any response from the WIA.

What's so important here is that a cross-sector group of amateurs (RASA, WIA and VKCC) were able to work collaboratively to achieve this outcome.



RASA illustrates what's possible when we put aside our differences and focus on the betterment of the hobby.

Why does the WIA continue to ignore our offers to work together? Why are our news stories censored?

We have a cordial and professional relationship with the WIA President, Scott Williams VK3KJ and some WIA working members. What is the establishment at the WIA so worried about?

If you'd like to see greater cooperation between RASA and WIA, please write an email to both Presidents expressing your views.

WIA President: Scott Williams VK3KJ  
[president@wia.org.au](mailto:president@wia.org.au)

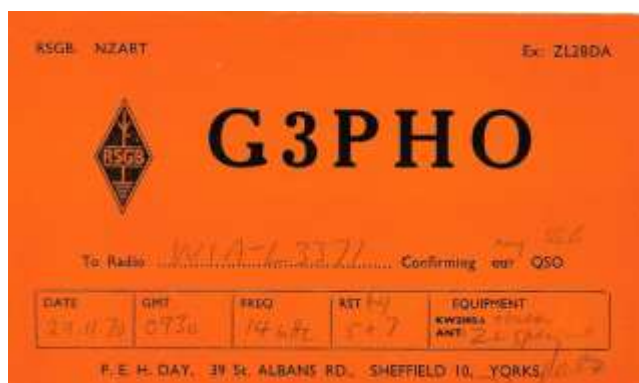
RASA President: Paul Anslow VK2APA  
[president@vkradioamateurs.org](mailto:president@vkradioamateurs.org)

We'll continue to reach out seeking cooperation via various channels.



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More QSL cards from Colin VK3NCC



## RASA's YouTube Channel

Did you know RASA has our own YouTube Channel? Click the YouTube logo below to visit our channel.



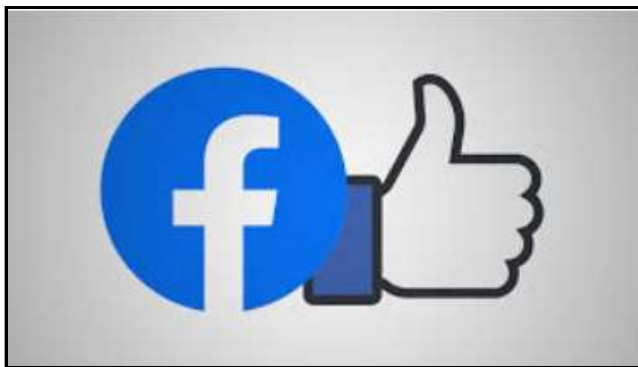
This channel is mostly dedicated to supporting QRM Guru. But you can also find other videos that may be of interest, including recordings of our Annual General Meetings.

## Social Media

*By Bob VK6POP*

Let's talk about Social Media and Amateur Radio

A significant number of Amateurs have taken to social media, and it's little wonder, because a part of Amateur Radio, that is the chinwag, is social media. Way before computers and the internet, even way before broadcast radio. We had Amateur Radio.



There were, and still are, accepted rules about which topics shouldn't be discussed on air, such as politics and religion, which most people comply with.

For the most part, social media on internet platforms is well used and used well.

The thing is, there are people in many walks of life who make it their business to make nasty, disparaging, even defamatory comments on social media, and Amateur Radio social media is no exception.

There's one particular Facebook Group, the largest Amateur Radio Facebook group in Australia, which harbours some of Amateur Radio's vilest commentators, who continue unabated to say what they like about people they don't like, or, and listen to this, belong to the wrong radio club, or are friends with the wrong people.

A few years ago, I was a regular contributor to that group, and one day when the vile comments were flowing, I asked the Admins to deal with the problem. They did deal with it. I was booted from the group.

Water under the bridge, so I went elsewhere, because my email to the Admin concerned went unanswered.

A few months ago, out of curiosity, I looked up that group on Facebook to see if it was still running, and there it was, with some of the same people still in charge. Nothing to see here, basically the same people, move on.

Something came up recently that prompted me to look it up again, and guess what - I could no longer see that Facebook group. Which means I've been blocked from that group. So here I am, not engaged in that group for some years, but I get blocked some time recently.

Now the reason I looked them up again was that I was shown a screenshot of a particularly vile, possibly defamatory post that was made recently.

It got me wondering about who's liable. Who should answer for defamation on a Facebook page?

I found this recent story on the ABC website, and the same story has been repeated on other sites. It's a report on a recent High Court ruling in Australia.

As much as social media has helped us to stay connected, especially for those stuck in lockdown, it has also become a home for vile and questionable commentary.

This from the ABC

*The High Court this week weighed into that issue, in a way, when it ruled that media companies are liable for any comments from the general public on posts they put on Facebook.*

*The case before the High Court directly involved some of the nation's biggest media organisations, but the consequences reach far beyond Australia's newsrooms.*

*If you're the admin of your band's Facebook page, or the local football club, or your own small business, it will matter to you too.*

*Communications law expert Brett Walker, from the Australian National University, said the decision had even broader consequences.*

*"Any organisation which administers a social media account could also be liable for defamation on the same basis — for example, businesses, sporting clubs and community groups," he told the ABC.*

*"The decision gives potential plaintiffs the choice of tracking down the 'anonymous' person who made a specific defamatory comment and taking action against them, or going straight after the publisher — ie the owner of the Facebook account.*

*"Most plaintiffs will take the second option as identity and ability to pay are clear."*

*Mr Walker argued the decision could let individuals who make harmful comments "off*

*the hook", and instead put the onus on those running a Facebook page to police the content posted to it by others.*

Credit to the ABC for that story.

The bottom line for those among us who are responsible for social media groups, is that as the account holder, or perhaps simply being a moderator, we must be vigilant both to protect our own interests and to avoid tarnishing the hobby.

By not moderating or deleting such content, you may be showing tacit support for the remarks. Tacit means that by saying nothing, you can be understood to have agreed with the comments.

Are you the owner, admin or moderator of a social media page or a group on platforms such as Facebook, Twitter etc? You need to manage what other people say on your watch. It could prove expensive.

And it's not hard - just deal with those who show no respect for others.

*(Editor: this advice also applies to email correspondence and any other communication you may have – think before you hit the enter button)*

## Hotspots: What are they and do you need one?

By Glenn VK4NGA

**W**hat is a hotspot, and do you need one?

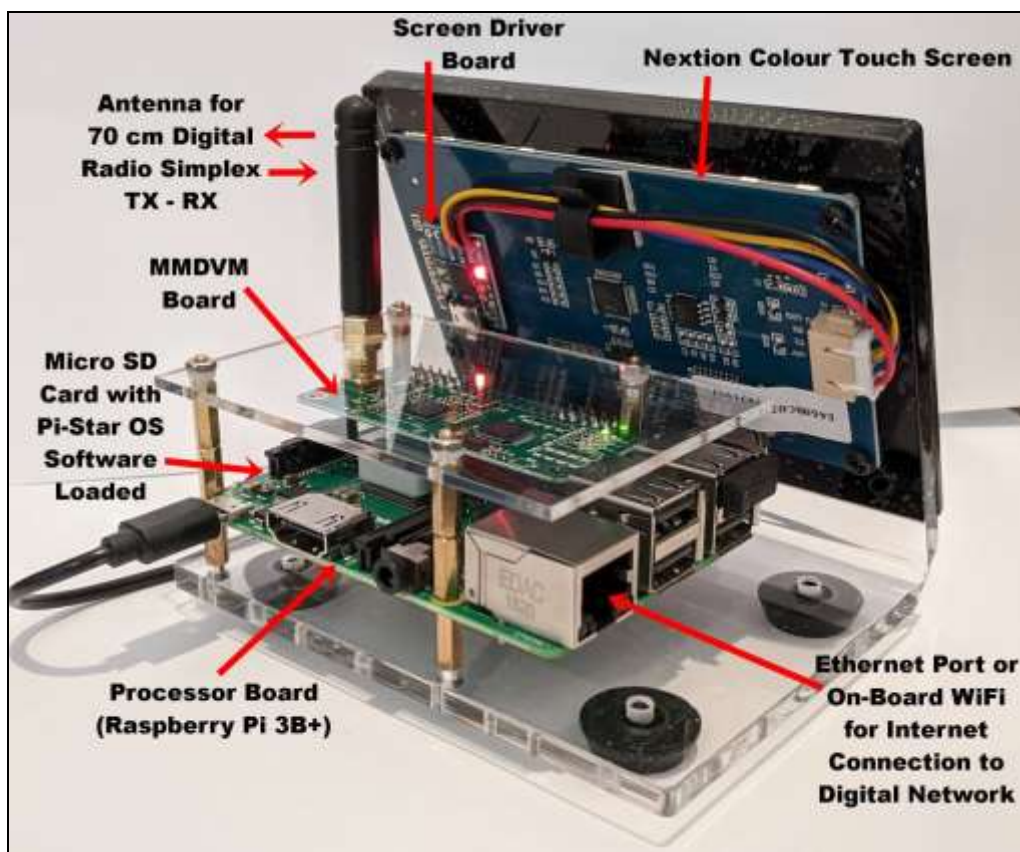
I often get emails asking about hotspots and how they work.

To get going on the digital voice modes such as DMR, Yaesu System Fusion (YSF), D-Star and P25 you need a digital capable radio for the mode you are interested in.

If you are fortunate enough to live near a digital capable repeater then a hotspot is not needed.

Hotspots are quite simple in the way that they work.

They are called MMDVM - multimode digital voice modem. Think of a hotspot as a personal repeater in your shack. Most hotspots will run DMR, Yaesu System Fusion (YSF), D-Star and P25 modes which are all configured via the software, and have a dashboard that can be accessed with any internet browser.



On one side you have the RF part which in almost all hotspots is on the 70cm band. The hotspot radio is in most cases 10 mW output, adjustable down to 1 mW.

The other part to a hotspot is the network side. This uses software to link the MMDVM to the main processor which then links via the internet to the mode that you have selected. It links via your home Wi-Fi and many hotspots are Ethernet capable. For



portable use you can connect it to a 4G modem or mobile phone for internet.

Most hotspots are simplex devices, however duplex hotspots are available – they have twin radio chips on the MMDVM, run 2 antennas and need a 5 – 7 MHz frequency split just like any repeater.

If you are thinking of stepping into the digital voice modes then DMR is a great choice. Here in Australia we have a fantastic network called the VK-DMR network. With over 55 repeaters and just under 300 hotspots connected it's a huge network with coverage right across VK.

Check out the website <https://vkdmr.com/> for more information.



Also, take a look at my [YouTube Channel](#), where you'll find loads of videos on Digital Voice modes.

If you have any questions don't hesitate to contact me, Email: [techboy@gypsymail.id.au](mailto:techboy@gypsymail.id.au)

## Amateur Radio News

For the best Amateur Radio news, on-air, online and Podcast. Click the image below for more info.



J. A. BOELL  
6 WILLS STREET  
DREDFORD, VIC. 3103  
AUSTRALIA

**VK3 AIF**

SWL - MNNH  
TO RADIO COLIN CONSIGLIO  
31 LYTTEN ST  
DEAR Glenroy VIC 3046  
THIS WILL CONFIRM OUR FRIENDLY QSO

**AUSTRALIA INVITES FRIENDSHIP AND SO DOES JOE**

| Date    | Time | Mode    | Band | FT | Comments |
|---------|------|---------|------|----|----------|
| 12/4/69 | 1240 | 2XSSB ✓ | 14   | —  | —        |

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VIA BUREAU  
OR MAIL  
SURFACE MAIL  
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ARE ENCLOSED FOR DIRECT QSL

GREETINGS and 73's  
Joe  
KCC OR

Operator:  
**HENK STUIVENBERG**  
Rotterdam - 25 Holland  
Strijensestraat 77c

**PAoSTU**

SWL WIA L3371  
To radio COLIN  
confirming our QSO  
on 15/4 68 at 0750 GMT  
on 1.8 - 3.5 - 7 - 14 - 21 - 28 - Mhz  
mode: 2 x ssb / cw  
ur R S S 6 T  
rig: 0 200 w 0 600 w  
ant: dipole, inv. V, TA 33  
Inx for QSO  
Pse QSL via POB 400 Rotterdam  
or direct  
73 de Henk

Colin  
Consiglio  
31 Lytton  
street  
Glenroy  
vic  
Austre.  
1 kopie naar  
Colin 73 Henk

Thanks Colin VK3NCC... we welcome interesting and historical QSL cards. What QSL cards do you have in your shack, or tucked away in an old shoe box?

Go find them, show them the light of day, relive some of your memories and please send us a scanned copy at the same time.



# Hotspots for Digital Voice Modes

**DMR | Fusion | D-Star | P25**



**DuraSpot 1**



**DuraSpot 2**



**ShackSpot 2 Plus**



**ShackSpot 2 Plus**

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**YouTube VK4NGA**

## Reverse Beacon Network - tools

By Chris VK3QB

We've written about the Reverse Beacon Network in previous editions. You can visit the FISTS Down Under web site [here](#) to learn more about the RBN.

By now I hope our readers are aware of the Reverse Beacon Network and are using it to their benefit. For those of us in VK3, the RASA RBN, VK3RASA, has been doing a great job since its installation late last year,

as have VK6ANC, VK2GEL, VK2EBN and VK4CT.

Phil, VK3VB brought this useful web site to my attention recently – a great way to get a pictorial representation of your activity.

To check it out and get your own report visit this website.

<https://rbn.telegraphy.de/activity>

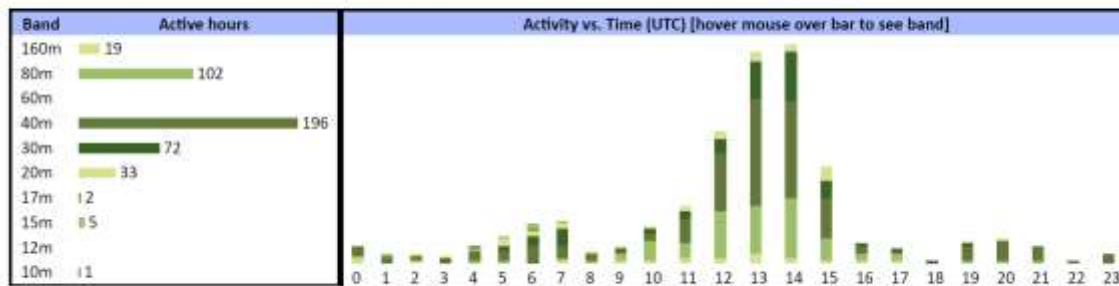
### RBN activity of VK3QB

The heatmap shows the activity as reported by the RBN (CW/PSK/RTTY, no FT8) of the last 12 months. You can scroll back to January 2015.



Previous Next Filter: 160m 80m 60m 40m 30m 20m 17m 15m 12m 10m 6m 4m 2m

Hours (in 365 days) with at least one RBN spot: 348 (1h / day). EU: 50, NA: 127, AS: 26, SA: 0, AF: 7, OC: 329, Rank: 3136



Generate this report for any call:  Go! - [FAQ](#) - [Data Removal](#) - etc. - You can generate joint reports for two calls, e.g. [DJ1YFK+SQ5CW](#)

With thanks to Phil VK3VB for alerting me to this useful resource.

# Antennapalooza **2021**

**Antennapalooza, now in its 7th year, will return to Drouin West on 4-5 December 2021 (Subject to Covid-19 restrictions)**

**The theme for 2021 will be *Working Mobile with Amateur Radio*.**

**Visit: <http://antennapalooza.net.au/>**

Set on a seven-acre field, 50km due East of Dandenong, visitors can bring their tent or caravan for the weekend, or just stay for a day. Set up an antenna and have a play on-air or take in the presentations on establishing a mobile station.

Entry is free. Bookings are not essential, but please register with your **name** and **callsign** so we can plan logistics. Let us know if you plan to camp or just stay for the day. Email us at: [sparky@dcsl.net.au](mailto:sparky@dcsl.net.au)

The website <http://antennapalooza.net.au/> will provide info on how to find the venue, what to expect when you get there and list the short presentations that will feature on the Saturday and Sunday.



Free tea, coffee & barbecue facilities will be on hand. Toilet facilities are provided. In the evening a warming fire will be lit in the treed area. (subject to fire restrictions)

Experienced Amateurs can try their field equipment, meet old

friends, and throw some snags on the barbie. Others who have heard a little about Amateur Radio, but want to know more, will benefit from this event.

Several clubs have been invited to both promote and sponsor this event:

**GGREC, FAMPARC, EMDRC, SPARC, MDRC, NERG, SHERBROOK & Eastern Zone.**

**[See you there!](#)**

## QRPp – Big results with little signals

By Chris G4UDG

I have been an avid QRP operator (5 Watts CW) for a good few years now. I have operated from various locations in the UK, Greece and Malta with great results and have always been amazed at some of the DX contacts I've made. Over the past 4 months I have reduced the RF power down to 100mW and less. (QRP-X ).

I use an Elecraft KX-3 (100mW steps) and my antenna is nothing special. It's a home made Rybakov vertical (7m tall fiberglass flag pole with wire attached, fed with RG58 to a 4:1 UN-UN, with one 10m wire radial bent at 90 degrees to fit into my small garden). I also have a Kenwood TS590SG. Its lowest power is 5 Watts so i have made an RF stepped attenuator for this radio operating from 7MHz and up CW only....

So, how are my QRPp efforts going?

A quick check of my paper logbook tells me I have 148 QSOs with this very low power ....in fact, 40 DXCC countries with 100mW or less....to OH8, LZ5, UE2, SX200, KP2, EA6,OY, CT9, US8, YL, W2, HB9 and many others. The best DX so far is FY5KE (French Guiana) at 7,013Km.

I've also worked ES0 with just 9mW (0.009W. TS590SG and RF stepped attenuator) at 1,836Km.

QRP-X is not for the faint hearted but with a little patience (and loads of luck) ham radio can still be enjoyed at these very low power levels..... I like a challenge 😊



(This article courtesy of FISTS Down Under)



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*Prices as of July 2020, prices are subject to change without notice*



## Antennas for small blocks – Part 2

By Paul Anslow VK2APA

In this issue of QTC we will continue examining the challenges of installing HF antennas on the ever-shrinking suburban block.



### Introduction

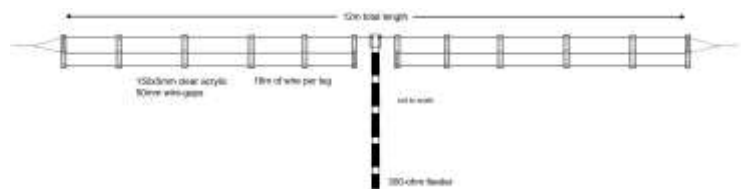
An Antenna along with the components to feed and match it, are considered an Antenna System. The Antenna System components interact with each other and with the antennas location - its environment.

As a result, there is no such thing as the perfect antenna design, location or installation. An antenna is often a compromise between performance, practicality and available resources. The reality is that simple antennas required to work on multiple bands generally have losses on some or all bands. Those picture perfect antennas you see in publications rarely exist unless you live on a very large block.

### Linear-Loaded Doublet

A Linear-Loaded Doublet (or in the USA a Cobra Antenna) is basically a folded dipole fed with with balanced feeder. The dimensions can be adjusted to suit your block.

Ideally the one shown here has the right wire length to work on 80M and above, depending on your installation environment.



You may adjust the total length a little and even add a fourth leg... Avoid feedline lengths of odd multiples of a quarter wavelength.

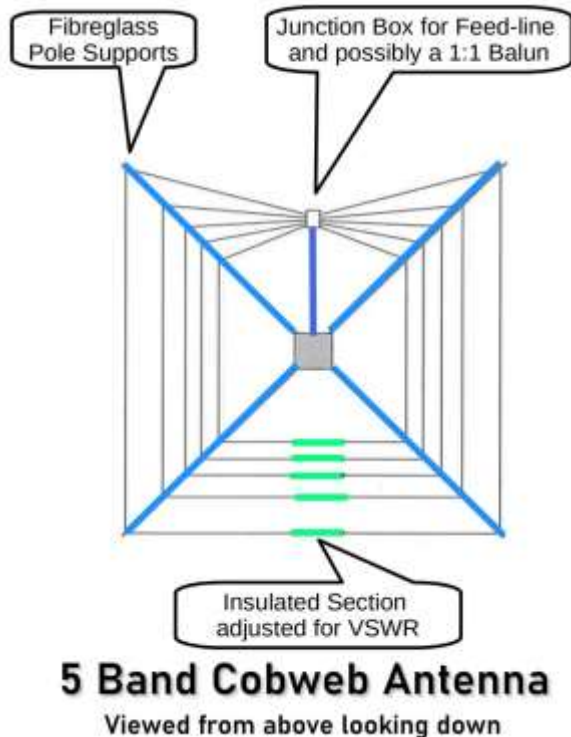
(see this [web site](#) for more info)

As the antenna is horizontally polarised, it tends to reject noise.

### The Cobweb Antenna

The cobweb antenna is similar to a folded doublet but has elements for several bands, typically 20M to 6M. The arms of a dipole are folded into a square, conserving space and giving a omnidirectional radiation pattern. The antenna is flat with a 2 dimensional appearance, reducing its visual impact. Gain is marginally lower than a regular dipole, however this may not be an issue due to the potential for better placement. It is an easy design and there are plenty of plans, kits and ready-made versions available.

When correctly assembled and physically tuned, the cobweb may not need an antenna matching unit and works on several frequencies.



Its relatively small size and light weight construction makes it easy to mount. It is visually not much bigger than some TV antennas. See an example [here](#).

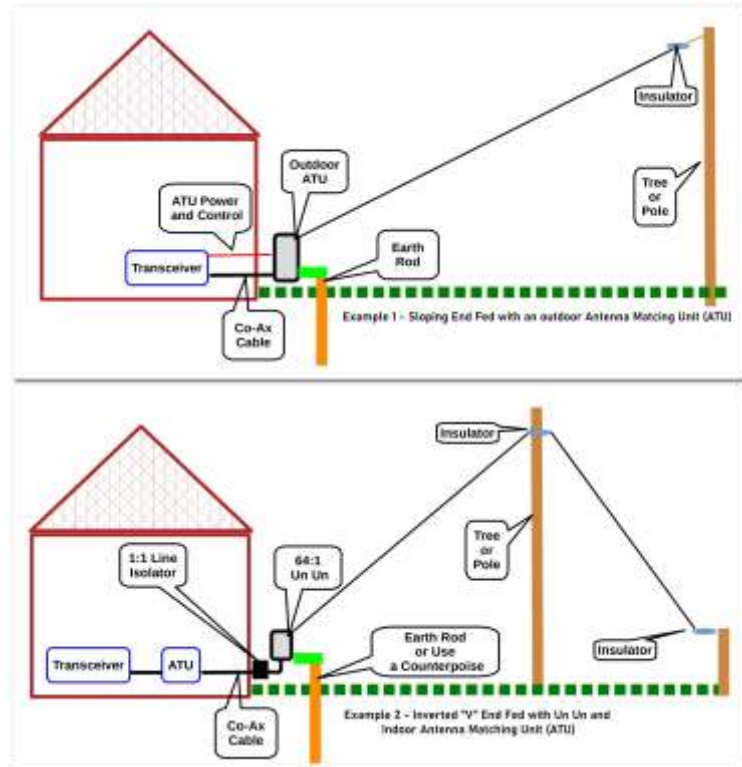
## The End Fed Antenna

The End Fed Antenna, often referred to as a Longwire has been in use in various configurations since the birth of radio. The End Fed can be a fixed frequency type or as a non-resonate broadband antenna depending how it is matched. Here we discuss the broadband version.

The advantages are their relative simplicity and ease of deployment, often used in portable situations. The antenna does not have to be straight, making it a suitable compromise on a small block and can be

concealed from prying eyes. Fine stainless steel balustrade wire works well

The disadvantages are that end-fed antennas may be noisier and may cause EMC or interference problems when poorly executed. The use of a UnUn and/or a suitable Antenna Matching Unit is essential due to the high impedance of the antenna feedpoint. By using an outdoor UnUn and coax will help keep RF the shack.



## A field day quick deployment end fed

[Here](#) is a useful website on the End Fed antenna with much more detail.



A field day quick deployment end fed antenna

Antennas do not have to textbook picture perfect to work and few antennas work perfectly on all frequencies. You may need to fiddle around a bit to get the results you want. Experimentation is a key part of our hobby after-all. Keep notes and share your successes with others.

## Next Time

In the next QTC we will look at vertical antennas.

## Support

We remember how hard it is when first starting out in Amateur Radio.

[Amateur Radio Tech Support](#) is an online Knowledge Base with a ticketing support portal. It is aimed at newcomers and provides a selection of Knowledge Base articles to help as you get started in the hobby. For more information, click on the logo.

If you do have QRM issues I do recommend you visiting [QRM.GURU](#) and following the process found at the [Start Here](#) menu.



Cobweb antenna







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» Prospect: 316 Main Nth Rd 08 8164 3466

Products also available through our regional reseller network & Leading Edge electronics stores.





## QRM Guru

### DX Zone's best links of 2020

You might recall in our last edition we were very pleased to report that Ian Jackson's (VK3BUF) article was rated as one of the best online Amateur Radio links for 2020 by DX Zone.

Congratulations Ian. We have confirmed that Ian's work with QRM Guru was nominated for a WIA Merit Award at their 2020 AGM. It is with great disappointment we advise that Ian's submission was not acknowledged or even included in the list of nominations. The WIA simply refused to accept Ian's work; such is the reluctance of some on the WIA Board to acknowledge the tremendous work done by the QRM Guru team.

We'll continue to submit articles and news items to the WIA in the hope that common sense prevails, and all amateurs can contribute to, and benefit from, QRM Guru.



Articles on QRM Guru, including Ian's, have been translated into Dutch, Greek, Italian and have also been seen on many other international sites.

Ian's article "[The Truth about Ferrites](#)" has been read over 16,400 times across 88 countries since it was published on 12<sup>th</sup> February 2020.

Read more about this story [here](#).

## What's our first recommendation for killing your QRM?

**D**on't assume you know what is creating the noise... and don't assume you know where it is coming from.

All too often we get emails, or see Facebook posts, where people have a screen shot from their radio's inbuilt spectrum scope and they are asking "*does anybody know what this is?*" or a variation on the theme.

Even if somebody offers a reasonable response, you still need to locate the offending noise source and confirm its your culprit.

We get emails where people are convinced the noise is coming from a building two houses away and it turns out to be a power pole 100m down the road – well beyond the erstwhile suspect neighbour.

We see posts online where people aren't even attempting to identify the noise source. They are simply taking the less interesting route of hoping someone will have the golden (and often elusive) panacea.

You might get lucky in your game of "whack a mole" first time around. But experience tells us this is unlikely. Follow the process; if for no other reason than you might learn something new, you'll hone a skill and be that much better prepared for next time. Or you'll be well placed to help a fellow amateur to locate and resolve their QRM.

Start a journal so you can profile the noise. You need to be able to describe the noise characteristics before you even leave the shack. Is the noise:

- frequency/band specific?
- time of day specific
- linked to an event (such as street lights coming on or a nearby factory starting a shift)
- coming from a certain direction

Next, you'll need to determine if the noise is originating from inside your property. The easiest way to do this is to power your receiver from a battery and turn off your mains power. You can follow this step of the process [here](#).

Finally, if the noise is originating from an external property, you'll need to apply your detective and sniffer skills to narrow down its location.

This month's RadCom magazine from RSGB had a very topical article by Ian Miles G0CNN. Ian applied the tools and techniques we promote in QRM Guru to hunt down and resolve his interference.



Ian G0CNN with his QRM Guru DF Loop  
(Source: RadCom Sept 2021)

In fact, Ian used the DF Loop design you can find [here](#). Ian has made some very nice structural modifications making the loop more robust as you go about the business of hunting down the noise source.

Ian's article is quite thorough and includes some nice photos of the process he followed: even to the point of illustrating how he triangulated his DFing to narrow down the noise source.



(Source: Radcom magazine)

Learn more about the QRM Guru process [here](#).

## QRM Guru solves interference problem at an industrial site.

By Ian VK3BUF

During a recent visit to a steel fabrication factory in Brisbane, a problem was reported with a wireless alert system. These systems use the LIPD (Low Interference Potential Device) frequency of 151 MHz – just outside the 144-148 MHz, 2M amateur band.

Production bays (or stations) use these LIPDs to call for support. Each bay has a multi-coloured column lamp to signal alerts. Several of the station points were working poorly, even though they individually tested fine. Their normal operating range of hundreds of metres was struggling to span more than 10-15 metres.

I activated the little Icom T90A receiver I had in the car at the time and dialled up 151 MHz for a bit of a listen. There was S9+ wideband noise, swamping the interior of the factory. It seemed to be everywhere, only starting to reduce at the far end of the building. It was very difficult to identify the source. Undoubtedly it was knocking out the data packets when station buttons were being pushed.

Wifi is a popular medium for short range communications, but the higher frequencies used perform poorly in metallic factory environments. This system used the lower frequency VHF RF modules, which generally perform much better in a large factory space. These can be half a kilometre long.

I returned two days later with a Coax DF Loop, built from the QRM Guru design. This antenna nulls out a noise source when broadside to it. Armed with DF Loop, I wandered around the factory. There were at least a dozen heavy-duty inverter MIG welders in use. Fortunately, they were all clean, which was impressive.

There were plenty of solar panels on the roof coupled to a big grid-connect inverter. This was another possible candidate for RF noise. It tested fine. I began to run out of ideas. I had proved that the interference peaked near one end of the factory, but there wasn't much to see there.

Looking up, there were lots of high-bay industrial LED lights, but these same lights were also present at the far end of the factory where the interference was low.

One clue; there was a single high-bay light close to where the noise peaked that wasn't working. Could it be that the LED string had gone open circuit and its un-loaded driver was running amok with QRM?

Lots of staff were working on steel fabrication tasks, so for safety reasons, we couldn't turn the lights off, even briefly, as there was limited natural light. We put a



rated work basket on a high-mast forklift and the house electrician went up and jacked out the faulty lamp. It made no difference. The interference was still strong with the lamp removed.

Normally close-up DF work is straightforward, but we were surrounded by steel walls, machinery and large projects under construction. There was a lot of RF reflection going on. The factory was very noisy with grinders and hammering, so everyone was wearing ear protection. It was difficult to listen to the receiver noise for nulls when the loop was rotated. I added a switchable RF attenuator to the loop. This dialled down the peak noise to an S5, allowing me to use the signal strength meter to visually identify nulls in the signal.



Tracking now took me to a blank interior wall that rose up the full height to the roof. About halfway down this wall there was a thin pvc duct, which dropped to about 3 metres above the ground and stopped again. It was hard to spot as it had been painted in the

same brown paint of the wall. With the loop broadside, the noise dropped. Edge on, the receiver went berserk. Whatever was inside the duct was radiating off the scale on 151 MHz – and about 5 MHz either side. I had to enter the office space to find out what it was.

In spite of the curious looks from the staff, I quickly identified the cable as a section of networking cable for an in-house security system where eight cameras could be viewed simultaneously on special monitors. It was the cabling between these monitors which was creating the interference. The coax braid was an excellent radiator. When they had to run a cable between floors, they took the easy way out by poking a hole in the wall, running it down the wall within the duct in the factory space, then back through another hole returning to the office space. Oddly, the RF noise was stronger in the factory area than in the offices themselves.

Now that I had located the source, it could be resolved, but not on the same day. After returning to my home state, I posted several large ferrite rings to the customer. These ferrite rings are the same as the ones distributed by QRM Guru. It was accompanied with instructions for the resident electrician to loop each end of the video coax at least 3 times through one of these rings. The ferrites absorb RF currents flowing along the outside of the cable, without having an impact on the video signals within the cable.

Within an hour of receiving them in the mail, the rings were fitted, and I received a phone call from the site. The interference had gone, and the alert system was operating as intended.

(As an aside, these alert systems, called 'Andon Systems' are in use at many high-profile sites around Australia and their operation would make an interesting article in their own right.)

It's true that this was an industrial site, and the biggest effect was on a commercial



frequency, but RF noise does not care who it annoys. This signal would have broken mute on any mobile listening on the 2 Metre band. Possibly it would have affected FM broadcast radio too.



When interference is widespread, it doesn't go away unless somebody makes the effort to do something about it. I was glad that in this instance we had a good outcome.

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### INTERNATIONAL SUPPORT: QRM Guru assists international operators with QRM issues

QRM Guru is now linked to the Amateur Radio Tech Support (ARTS) ticketing system. This enables users from VK and around the world to raise support tickets if they need a little extra assistance in working through the process.



As word spreads, we are seeing more international amateurs using QRM guru and requesting support via our online ticketing system.

ARTS is a great example of how a member based organisation can use a Help Desk Ticketing System to provide real value to its members.

You can visit ARTS [here](#).

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What's in your pockets?



Another QSL card from Colin

## The positive side of QRM.

**W**hen the Australian website QRM Guru was launched in 2018, the intention was to help Amateurs resolve their interference issues and improve their enjoyment of the hobby. As the website has grown, so has the interest of operators around the world. All Amateurs experience some level of interference. Thousands have read the articles and seen the videos on building basic tools to trace their interference sources. Even long-established operators have embraced QRM mitigation concepts and acquired new skills.

***Identifying interference sources and tracking them down has become an extension of the hobby itself and many are enjoying this challenge.***



To be clear, interference is bad, and we don't want it to happen, but feedback from our radio community tells us that there are a lot of positives coming from QRM busting. A

good driver will treat an annoying rattle in a car as a sign that something isn't right. A new source of radio interference should be treated the same way. Perhaps an old power supply with leaky capacitors has begun to radiate, or a cooked semiconductor, just shy of catching fire has begun to oscillate up the spectrum. An electric arc between two dusty terminals manifesting as an RF noise source can be an early warning of a mess yet to unfold.

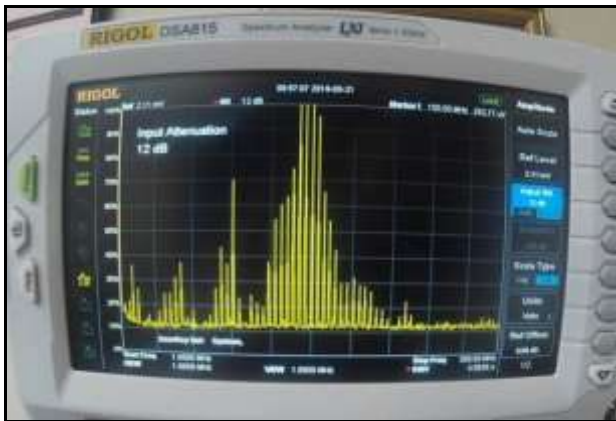
A QRM source is often a sign that equipment is under stress, overloaded, working outside of its design range and operating close to failure. Amateurs should not shy away from a process of discovery. It is in their interests and everyone around them to neutralise these sources of noise. Plenty of inspirational door-knocking experiences have occurred as a result of interference tracking. Usually neighbours will express interest in the work and actively cooperate. The process can open a window to Amateur Radio. It is a means to de-mystify the hobby and to allow the public to become more informed about our work.

It's true that some neighbours may take a defiant stance when approached and won't care about 'your' interference problems. Such occasions are an opportunity to show that resolving interference is good for the neighbour. Invoking their self-interest can be a path to resolving QRM. The same interference that upsets your Amateur station can be killing their AM/FM radio, their TV reception or the speed of their WiFi services. Interference is a sign of energy loss that the neighbour could be paying for. Amateurs tracking down those noise sources can attract positive attention within the community. This can be good publicity and help our neighbours to become more tolerant of the hardware we visibly extend into the air.

The results of QRM tracing efforts can have commercial impact as well. Being able to

identify a noisy power pole to a power company can flag an early warning of failing infrastructure. A pole fire, or in extreme heat, a bushfire, could be averted through the efforts of a local 'ham radio operator'.

The identification of an ignition source through its RF interference signature is a vital community service.



Every country has its own telecommunications authority, tasked with addressing and reducing radio and electrical interference. It is common for such Departments to be small and under-resourced. Should an Amateur call and say: *“Hey I have this annoying noise on 40 metres. Come and check it out”* the regulator probably won't have the resources to conduct an investigation.

Yet interference problems are progressively worsening around the world. Where intervention by the regulator becomes

necessary, the way forward is for Amateurs to do as much preliminary investigation as they can, then provide a concise body of evidence to support their claims.

In Australia, with three years of assistance from the QRM Guru website, the regulator has seen positive change. Feedback confirms that complaints from Amateurs are now fewer, but when they are submitted, they are more concise and better organised.

Amateur Radio has gone through many periods of change over the past one hundred and ten years. We are all surrounded by new technology that pollutes our radio spectrum space far more often than it should. Much of this comes from poor quality equipment that has never been designed to last, radiating, and overheating as it slowly fails. The need for Amateurs to embrace their own interference issues has become an essential part of this change.

A loud buzz on the radio is not just a nuisance. It is a challenge and an opportunity to do good work in the community.

Skilling up and tracking down sources of interference is in our interests and has become another important aspect of keeping Amateur Radio alive.

Visit <https://qrm.guru/> to find out more.



## *Beware of dumb smart chargers*

There are occasions with Amateur Radio projects where a small but continuous 12V supply is needed. Maybe for a repeater, a security system, or just a shack receiver. An easy way out is to use a 12V sealed lead-acid battery with a suitable charger. You have a cheap and reliable backup supply.

However, many of the 240V supply chargers now available to maintain your battery have a flaw. Touted as 'smart' chargers they will automatically figure out if your battery is 6V, 12V and sometimes 24V, then try to go about perfectly maintaining your battery.

Therein lies the problem.

If the power is off long enough, your 12V battery will gradually go flat. 10V, 8V, 6V...

When the power comes back on, your fancy 'smart' charger springs into action to recharge your battery.

The smart charger sees the flat 12V battery, which is now at say 5 or 6 Volts, and thinks: 'Hey, here's a 6V battery. I'm going to charge it up to 7V'.

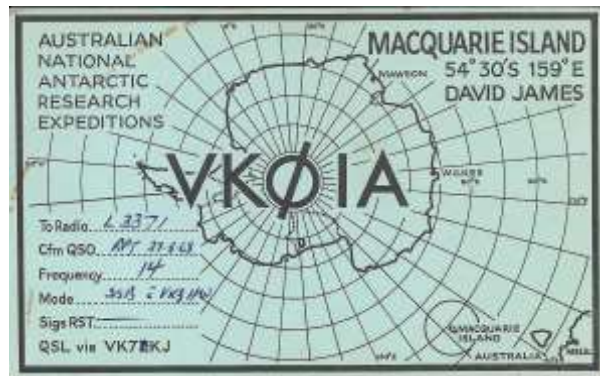
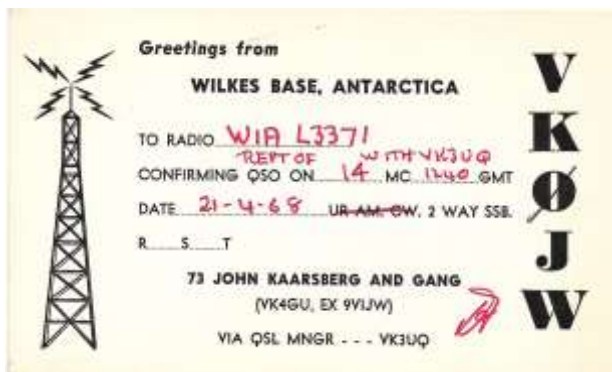
When you eventually return to the site, you find that your expensive 12V battery has been floated at 7V for some time and the cells are damaged.

The lesson here is to choose your charger with care. If you have a critical 12V or 24V battery system, float charge it with an intelligent charger dedicated to that voltage. Don't use one of the automatic multi-range chargers which are so common today.





Thanks to Colin VK3NCC for sending us a few more QSL cards from his collection.



## Club Visits

Even through the Covid lockdowns of the past two years, RASA has been offerings Zoom presentations. We hope we can get back to face-to-face meetings in 2022.

We can talk about what we've been up to, and perhaps more importantly, hear your views and answer your questions.

In the meantime, if your club would like a Zoom presentation, please drop us an email.

RASA is the only national body that visits clubs regularly (in-person or by Zoom).

Email us [info@vkradioamateurs.org](mailto:info@vkradioamateurs.org)

## **RASA 2021 AGM & Results**

*By Paul VK2APA*

**H**ello,

I am Paul VK2APA, the new President of RASA.

Most of you know me from managing the RASA membership over the last 12 months. Some of you know me from my education and training activities when I resided in Sydney. I won't bore you with [my bio - it is available on the RASA website](#).

Glenn, VK4DU our outgoing President, was a founding member of RASA and under his leadership the management team has accomplished a great deal supporting amateur radio. On behalf of the membership and the RASA management team, I would like to thank Glenn for his contribution to RASA and Amateur Radio. Please join me in wishing Glenn success in continuing to support amateur radio in the future.

What is in store for RASA during the next 12 months?

RASA will continue with the development of our current role and initiatives and be quick to respond to new challenges and opportunities in the future.

- Continue to communicate with VK Hams regularly & openly seek feedback from our members and the Amateur Radio community.
- Education & Awareness on VK regulations & the ACMA
- Continue to develop, promote and support QRM Guru and Amateur Radio Tech Support - ARTS.
- Lobby for 1KW for the Advanced licensees.
- Assist with rollout of 2x1 contest call signs.
- Continue to further develop resources to help Foundation Licensees and newcomers.
- Examine the potential of further WSPR rollouts.
- Support a Syllabus review that reflects today's Amateur Radio.
- And a close look at the future and direction of Amateur Radio.

This only happens with the input and support of our members and the AR community. I and the RASA Team thank you. We value your support and look forward to working with you.

On behalf of the RASA Management Team, I wish you success in your Amateur Radio endeavours.

If you missed our AGM, you can catch up [here](#).

The following 12 pages are a direct extract from our 2021 Annual Report.

**W**elcome to our 2021 Annual Report.

2020-21 has been another successful year for RASA. We grew our membership numbers (557 compared to 481 last year) and launched more innovative resources for amateur radio in Australia.

## **Representation & ACMA**

Over the course of the year, RASA's focus on representation has included:

- full access to 50-54 MHz for standard class amateurs;
- a detailed response to ACMA's consultation on use of the 5 MHz band;
- retention of the connection between callsign numerals and station location;
- investigation of 40m QRM from Indonesia;
- implementation of 2 x 1 contest callsigns;
- a more equitable and transparent process for assignment of repeater frequencies;
- 1 kW output power for Advanced class licencees; and
- a detailed response to ACMA's consultation paper on class licencing.

As we all know, ACMA have proposed sweeping changes to amateur radio licencing with their proposal for a class licence. They have advised that the level of interference protection provided under any proposed class licence would effectively be the same as the current apparatus licence arrangements.

ACMA have received over 800 submissions in response to their consultation on licencing changes. They are currently considering the submissions and will update the amateur community on the next steps when they can.

ACMA also released a survey on implementation of 2 x 1 contest callsigns in August. RASA made a submission to the survey, noting the need to ensure that the callsigns are used for their intended purpose, whilst making them available to as many advanced and club stations as possible.

## Annual Report Continued

### Resources for Amateur Radio

RASA continues to focus on delivering resources and assistance for the amateur radio community.



## *Helping to Resolve QRM*

The plethora of electrical devices that now flood our homes (and those of our neighbours) have made amateur radio almost unusable for many suburban amateurs.

QRM Guru was released in March 2019 at PerthTech in VK6. Since then, it has grown in content and popularity.

In the **last 12 months** QRM Guru has had:

**41,245 unique visitors**  
**from 168 countries**  
**with 140,674 page visits**

This resource is provided free of charge to all radio amateurs to assist in identifying and resolving or minimizing local RFI/QRM issues. QRM Guru has also proven to be an effective educational resource.

Over 29 hams from around the world have contributed to QRM Guru, but perhaps the most notable is Ian Jackson, VK3BUF. Ian has conducted a number of experiments and written articles which take some of the mystery out of hitherto complex concepts. Perhaps his most notable article demystifies ferrites and how they can be applied to RFI suppression.

<https://qrm.guru/the-truth-about-ferrites/>

This article has been read over **16,848** times across **88** countries since it was published on 12 Feb 2020.

It was listed in DXZones “Best Amateur Radio Links of 2020”

<https://www.dxzone.com/the-best-amateur-radio-links-of-2020/>

Along with other QRM Guru articles it has been translated into multiple languages (inc. Dutch, German, Italian, Greek).



QRM Guru has developed 12 educational videos to introduce complex topics in a pragmatic manner. These videos simplify what can be very complex concepts.

<https://qrm.guru/qrm-guru-videos/>

QRM Guru offers a kit of ferrites and a DF Loop antenna to VK hams along with practical instructions in how to apply them for maximum effect. There are over 30 examples where RASA has assisted VK and international hams in resolving RFI issues. Countless others have benefited from this resource.

Leigh Turner VK5KLT a Professional RF Engineer, reviewed Ian's article "*The Truth about ferrites*" and commended Ian on a "*brass-tacks practical AR oriented article*" that will "*materially advanced amateur knowledge about RFI and noise mitigation techniques*".

This practical resource, accessible to all radio amateurs, is a first of its kind. It evolves as new case studies and experiences are shared by the collaborators and contributors. QRM Guru represents the very foundations of the amateur radio spirit:

*Hams helping hams.*

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*QRM Guru is a practical resource to help amateurs help themselves. We encourage and welcome input and participation from amateurs and clubs worldwide.*

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## Annual Report Continued



### *Regulations in plain English*

In 2020 we released [www.vkregs.info](http://www.vkregs.info)

This resource provides a guide to the regulations governing the hobby of amateur radio in Australia.

It is a joint publication of the Radio Amateur Society of Australia ([RASA](#)) and the Radio and Electronics School ([RES](#)).

You can read the about the regulations on the website or download a complete pdf guidebook version.

Note that the Foundation exam uses a subset of the full regulations detailed here. You should be guided by the Foundation syllabus and any course of instruction you may be undertaking to determine the appropriate regulatory elements to learn.

Like all RASA resources, this guide is provided at no charge to the amateur radio community, however [donations](#) are welcome.

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*One of our core objectives is to support and educate the  
amateur radio community.  
RASA & RES*

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## Annual Report Continued



## *Amateur Radio Tech Support*

The **Amateur Radio Tech Support Service** (ARTS) is an online Knowledge Base with a ticketing support portal. It is aimed at newcomers and provides a selection of Knowledge Base articles to help newcomers as they get started in the hobby.

We often see newcomers asking questions in various on-line forums such as

*I want to work some DX on 40m. What type of antenna is best suited to my house block?*

*I have terrible noise on 80m... I can't hear any signals. Where do I start?*

*How far can I work on 2m?*

*I am setting up my first amateur station at home and need some help.*

*What type of feedline I should buy?*

The basic tenets of our hobby prevail: we encourage experimentation, learning and self-improvement.

So, if you are a newcomer (any class of licence), have a look at the resource.

Visit: <https://amateurradiotechsupport.freshdesk.com/support/home>

Amateur Radio Tech Support provides basic Knowledge Base articles to help get you started. If you need further support or simply want to ask a question, then raise a ticket.

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*Support and education for the amateur radio community.*

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## Annual Report Continued



### *QTC Magazine – a new magazine, a new format*

RASA decided to create a new online, free magazine for the VK Amateur Radio community in 2020. Amateur Radio magazines have not changed in decades and we felt it was time for a fresh new format.

Since July 2020 we have been producing a true online magazine; available in PDF format and also as an interactive electronic magazine. Both formats provide hotlinks to external sources and web sites, and the new electronic magazine offers a traditional magazine look/feel with page turning, hotlinks and embedded videos.

The magazine is free and available for anyone who has an interest in Amateur Radio.

We ensure this magazine includes up-to-date practical articles and news on what's happening with ACMA, representation and regulations here in Australia.

There have been over 13,000 downloads of [QTC](#).

Please spread the word - let your clubs and friends know about [QTC](#). Grab your copy [here](#).

Thanks to our advertisers for their support. If you'd like to advertise and get the benefit of our circulation and embedded hotlinks, please send us an email.

If you'd like to write an article for QTC please drop us an email.

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*QTC Magazine – a true online publication*

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## Annual Report Continued



## *Amateur Radio Welcome Pack*

RASA has put together a free **Amateur Radio Welcome Pack**. These packs comprise a portfolio folder which includes a number of useful documents and reference sheets.

Give your students some practical and relevant material to take away at the end of the course.

Included in this **Welcome Pack** are some documents and information sheets to help your students get started.

- Welcome to Amateur Radio Guide Book
- VK Regulations Handbook
- Getting started with Repeaters
- Australian Band Plan Quick Reference Guide
- Interference Resolution (QRM) Process Guide
- Useful Web sites information sheet

If your club is running a course and would like to provide these resources to your students just send us an email. This is a free resource. We only ask that you cover postage costs.

Interested? Have your Club President, Secretary or Education Officer email us at [info@vkradioamateurs.org](mailto:info@vkradioamateurs.org)

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*Education & information*

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## Annual Report Continued



Thanks in part to a financial grant from FISTS Down Under, (Morse Code Preservation Society), RASA has deployed a new Reverse Beacon here in VK. It operates under the identifier VK3RASA and is located in Gippsland, about 100km East of Melbourne.

Please visit FISTS Down Under web site to read more about their initiatives to grow the RBN network in VK by following this link:

<http://www.fdu.org.au/reverse-beacon-network/>

Practical support for the hobby and interesting technology – mixing the original mode with the newest tech.

Read more about the RASA RBN in the December issue of QTC magazine (QTC 4) [here](#). Or the flip version [here](#).

[www.reversebeacon.net](http://www.reversebeacon.net)

| showing spots for spotter call: VK3RASA |                                                                                              |        |       |       |        | rows to show: 40 ▾           |
|-----------------------------------------|----------------------------------------------------------------------------------------------|--------|-------|-------|--------|------------------------------|
| search spot by callsign                 |                                                                                              |        |       |       |        |                              |
| de                                      | dx                                                                                           | freq   | cq/dx | snr   | speed  | time                         |
| VK3RASA                                 |  R1530IG  | 3520.0 | CW CQ | 22 dB | 29 wpm | <a href="#">2020z 27 Aug</a> |
| VK3RASA                                 |  8N2OLP   | 3512.9 | CW CQ | 16 dB | 21 wpm | <a href="#">2008z 27 Aug</a> |
| VK3RASA                                 |  HA7JQK   | 3519.5 | CW CQ | 8 dB  | 29 wpm | <a href="#">2004z 27 Aug</a> |
| VK3RASA                                 |  DL5ANT   | 7002.5 | CW CQ | 12 dB | 26 wpm | <a href="#">2003z 27 Aug</a> |
| VK3RASA                                 |  SP60VHSC | 7010.8 | CW CQ | 15 dB | 26 wpm | <a href="#">1957z 27 Aug</a> |
| VK3RASA                                 |  R4BM     | 7017.0 | CW CQ | 6 dB  | 25 wpm | <a href="#">1942z 27 Aug</a> |
| VK3RASA                                 |  R4BZ     | 7017.0 | CW CQ | 6 dB  | 26 wpm | <a href="#">1941z 27 Aug</a> |
| VK3RASA                                 |  LZ1KFM   | 7017.7 | CW CQ | 24 dB | 33 wpm | <a href="#">1938z 27 Aug</a> |
| VK3RASA                                 |  LZ1KFM   | 7017.7 | CW CQ | 25 dB | 33 wpm | <a href="#">1928z 27 Aug</a> |
| VK3RASA                                 |  4X6FR    | 7013.9 | CW CQ | 8 dB  | 26 wpm | <a href="#">1927z 27 Aug</a> |
| VK3RASA                                 |  RU3X     | 3507.0 | CW CQ | 6 dB  | 20 wpm | <a href="#">1927z 27 Aug</a> |

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*Supporting on-air activity with the RBN*

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## Annual Report Continued

### The future

Amateur radio in Australia faces some sweeping changes over the next few years.

- the regulator clearly wishes to be more “hands off”;
- the preponderance of QRM-generating domestic devices is making HF operation increasingly difficult in suburbia;
- our demographic is ageing; and
- the examination syllabi need to better reflect current technology.

RASA could not function without our members.

On behalf of the Committee, thank you for your financial support and goodwill over the past year.

A handwritten signature in black ink, appearing to read 'G.C. Dunstan', with a stylized flourish at the end.

G.C. Dunstan, VK4DU  
President  
2<sup>nd</sup> September 2021

## Annual Report Continued

### *2021 Financial Report*

2021 was another year of growth for RASA. We continue to operate an efficient and sustainable financial and operational model providing representation and support for the AR community. Committee continues to manage all costs responsibly and ensure the ongoing financial viability of the association.

Revenue is up by 10%, with membership and donations making the lion's share of growth. Our ongoing focus on software costs has enabled us to reduce these costs (our largest) by 5%. I am pleased to report a surplus of \$2,471.09 for 2021.

On behalf of committee, I extend thanks to all our members and supporters for subscription payments and generous donations.



Chris Chapman, VK3QB  
Treasurer  
2<sup>nd</sup> September 2021

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*Responsible and sustainable  
financial management*

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## Annual Report Continued

## Profit and loss

For 1 September 2020 to 31 August 2021 vs 1 September 2019 to 31 August 2020,  
cash basis

| ACCOUNT                          | AMOUNT             | COMPARISON<br>AMOUNT | VARIANCE<br>(%) |
|----------------------------------|--------------------|----------------------|-----------------|
| <b>INCOME</b>                    |                    |                      |                 |
| QTC Advertising                  | \$580.00           | \$230.00             | 152.2% ▲        |
| QRM-Kill-Kits (Note 1)           | \$3,643.00         | \$4,988.00           | -27.0% ▼        |
| Membership Subscriptions         | \$3,938.89         | \$2,728.00           | 44.0% ▲         |
| Donations                        | \$3,598.46         | \$2,705.28           | 33.0% ▲         |
| Interest Received                | \$0.73             | \$1.01               | -27.7% ▼        |
| <b>TOTAL INCOME</b>              | <b>\$11,761.08</b> | <b>\$10,652.29</b>   | <b>10.3% ▲</b>  |
| <b>EXPENSES</b>                  |                    |                      |                 |
| PayPal Fees                      | \$358.87           | \$291.56             | 23.1% ▲         |
| Welcome Packs                    | \$310.88           | -                    | -               |
| RBN Project                      | \$872.99           | \$902.02             | -3.2% ▼         |
| Expenses - QRM Kill Kits         | \$4,328.03         | \$3,066.04           | 41.2% ▲         |
| Expenses - Representation        | -                  | \$211.76             | -100.0% ▼       |
| Fees                             | \$59.20            | \$66.05              | -10.4% ▼        |
| Licences                         | \$55.00            | \$342.00             | -83.9% ▼        |
| Total Fees                       | \$114.20           | \$408.05             | -72.0% ▼        |
| Software Subscriptions (Note 2)  | \$3,218.59         | \$3,378.22           | -4.7% ▼         |
| RASA Donations                   | -                  | \$100.00             | -100.0% ▼       |
| OCDX Contest                     | \$50.00            | \$50.00              | 0.0%            |
| Total RASA Donations             | \$50.00            | \$150.00             | -66.7% ▼        |
| Expenses - Member Services       | -                  | -                    | 0.0%            |
| Club Events                      | -                  | \$607.86             | -100.0% ▼       |
| Total Expenses - Member Services | \$0.00             | \$607.86             | -100.0% ▼       |
| Bank Charges                     | \$36.43            | \$4.49               | 711.4% ▲        |
| <b>TOTAL EXPENSES</b>            | <b>\$9,289.99</b>  | <b>\$8,728.44</b>    | <b>2.3% ▲</b>   |
| <b>NET POSITION</b>              |                    |                      |                 |
| Income                           | \$11,761.08        | \$10,652.29          | 10.3% ▲         |
| Expenses                         | \$9,289.99         | \$8,728.44           | 2.3% ▲          |
| Other income                     | \$0.00             | \$0.00               | 0.0%            |
| Other expenses                   | \$0.00             | \$0.00               | 0.0%            |
| <b>NET POSITION</b>              | <b>\$2,471.09</b>  | <b>\$1,632.29</b>    | <b>50.8% ▲</b>  |

## NOTES:

## \*1 – QRM Guru

## Stock-on-hand

- 21 \* QRM Kill Kits
- 7 \* DF Loop Kits
- 8 \* QRM (Club) Kits (no sales value on these as they are donated to clubs)

The above represent a sales value of \$1,225

## Annual Report Continued

### \*2 - Software:

RASA minimises operational costs with all business functions delivered online. This enables us to direct our money into resources and representation for the betterment of amateur radio. Our largest costs are software subscriptions, and these are made up of the following:

- Membership management and email distribution
- Accounting
- Team Collaboration (cloud storage and virtual meeting apps)
- Email hosting
- Web sites and hosting
  - [www.vkradioamateurs.org](http://www.vkradioamateurs.org)
  - [www.qrm.guru](http://www.qrm.guru)
  - [www.vkregs.info](http://www.vkregs.info)
  - [www.antennapalooza.net.au](http://www.antennapalooza.net.au)
  - [www.qtcmag.com](http://www.qtcmag.com)
- Magazine publishing

## Balance sheet

For the year ending 31 August 2021, cash basis

| ACCOUNT CODE          | ACCOUNT NAME                                   | BALANCE           |
|-----------------------|------------------------------------------------|-------------------|
| <b>ASSETS</b>         |                                                |                   |
| <b>CURRENT ASSETS</b> |                                                |                   |
| -                     | Bank - RASA Trading Account                    | \$5,296.18        |
|                       | <b>TOTAL CURRENT ASSETS</b>                    | <b>\$5,296.18</b> |
|                       | <b>TOTAL ASSETS</b>                            | <b>\$5,296.18</b> |
|                       | <b>NET ASSETS</b>                              | <b>\$5,296.18</b> |
| <b>EQUITY</b>         |                                                |                   |
|                       | Retained Earnings Surplus/(Accumulated Losses) | \$2,825.09        |
| -                     | Current year earnings                          | \$2,471.09        |
|                       | <b>TOTAL EQUITY</b>                            | <b>\$5,296.18</b> |

## ***What's the best wire for a dipole?***

*By Ian VK3BUF*

As long as radio has existed there have been wire antennas. These have been made from a diverse range of conductive materials. Often the selection criteria comes down to price, weight, availability, and strength, rather than RF efficiency.



There has been no shortage of controversy, theory, and anecdotes about which type of wire is best suited to antenna construction. Trial data on this topic is difficult to find. There are questions about other properties, such as the effect of plastic coatings on wire and the merit of single versus multi-strand wire. What about the strength of stainless-steel verses the high conductivity of hard drawn copper?

The big question remains.....

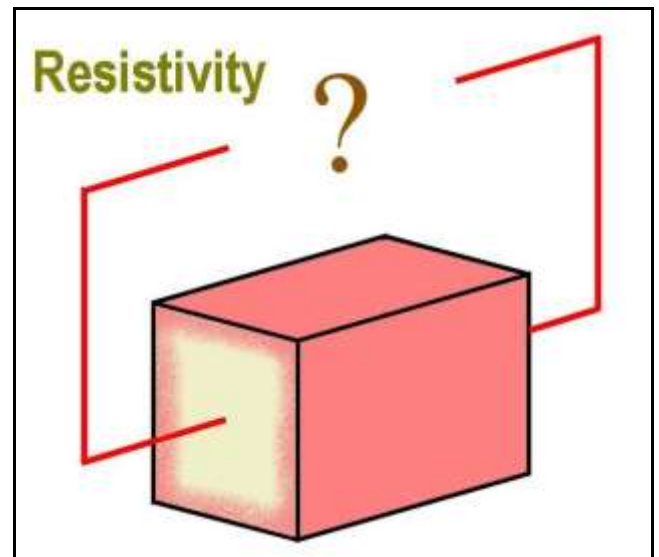
### ***Which wire should I use to build my HF antennas?***

We decided to road-test a selection and find out which material performed best in the field. Fundamentally, we wanted to see how received signals varied from a low-

power signal transmitted from different antenna wires.

### **What's in a wire?**

Different metals have a different intrinsic resistance, or 'resistivity'. A high resistivity will suppress RF current flow and dissipate this precious energy as heat. Resistivity tables tell us that copper is a great conductor, up there between gold and silver, while steel has around three times the resistance.



*Metal resistance is not the whole story*

The ever-popular wire of choice for many commercial and amateur HF antennas, stainless steel, has an even higher resistivity.

Looking only at these passive resistance tables, one could conclude that using any conductor other than copper would be a poor choice. However, there is much more to this story at radio frequencies.

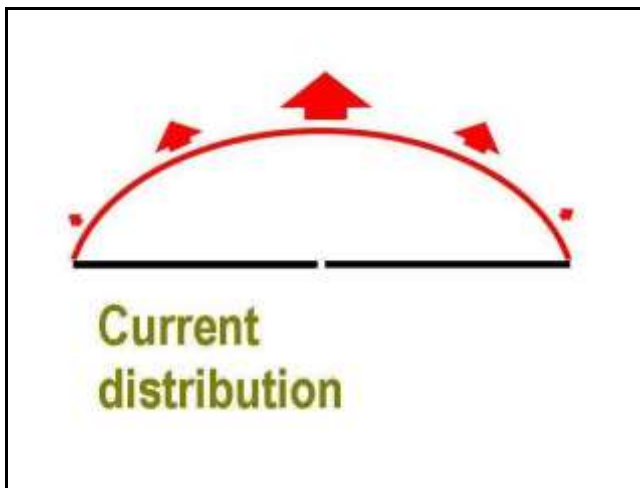
When wire is created there are surface tempering effects within the metals. Resistance is not always even through a cross section of wire. At radio frequencies

there is a tendency for currents to flow on the surface of conductors rather than through the centre. This is called '*skin effect*' and it becomes more pronounced as the frequency increases.

This means that at 160M and 80M the RF penetration into a wire conductor will be deeper than for higher bands. This will have some effect on the total radiation resistance for any given type of wire.

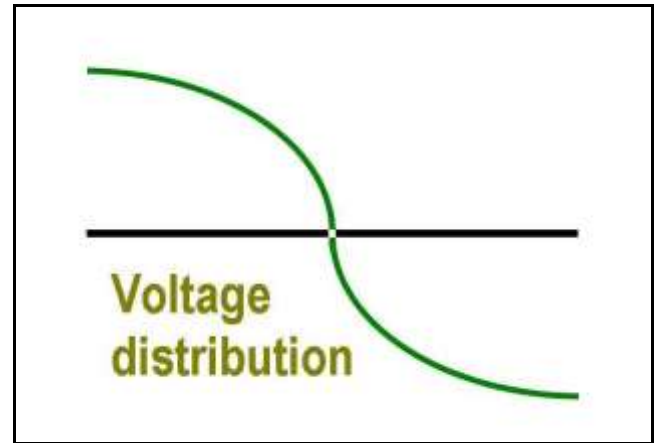
"*Skin Effect*" applies to each individual conductor. Wire made up of several thin conductors instead of one larger conductor has the equivalence of several parallel conductors. This increases the amount of skin effect, further lowering the wires overall resistance.

RF currents behave differently to conventional DC electrical current flows. There are voltage and current distributions along the length of an antenna. Current flows are not even. In a basic Dipole antenna, the voltage potential rises to a maximum at the ends, while current distribution is greatest at the feedpoint. Most of the RF current flow in a dipole never reaches the ends of the wire.



This current distribution is also one of the reasons why top-loaded mobile antennas generally out-perform base loaded mobile antennas. The section of maximum current radiation in a base loaded vertical will also be subject to greater radiation resistance

due to the presence of the loading coil. Unfortunately, top-loaded antennas tend to be top-heavy, an unwanted design characteristic in a mobile antenna. Physical design compromises are common with many antenna designs.



### Designing the experiment

Differences in signal strengths between the various conductors was likely to be subtle. For simplicity, we decided to perform these tests with dipole antennas on the 15 metre band. Being at the high end of HF, the skin effect would be more pronounced. If the skin effect was going to be significant for our experiments, then we would more likely see any differences on 15 Metres than on lower frequencies.



Chris VK3QB trims antennas to size



We needed a suitable test environment with the distance between the transmitter and receiver being appropriate. We wanted to minimise external disruptions, such as multipathing, polarisation shifts and unwanted reflections.

The objective was to provide a weak but stable signal transmitted from each of the test antennas and received signals to be measured several wavelengths away.

A pair of 6m tall PVC posts were erected, guyed with plastic rope to create a reasonably RF transparent structure. Just over 200 metres away two more posts were set up for the receiving antenna.



*The temporary transmit and receive masts were guyed lengths of 90 mm PVC pipe*

For a transmitter we used an RF signal generator (Shlumberger 4011 test set), producing about one milliwatt of unmodulated RF energy on 21.2 MHz. By testing at these low levels, the receiver would not be overloaded and our test signal would not be disruptive to others.

For a receiver we used a Rigol DSA815 spectrum analyser. The receiver monitor produces a signal spike where fractions of dB changes in signal strengths are easily measurable.

The Rigol spectrum analyser is more accurate than an S-meter on a HF radio. Most modern HF rigs use segmented bar graphs that lack fine resolution.

Ten dipoles, made from different conducting materials were constructed. Each dipole would be coupled to a 1:1 balun at the feed point. They would be tied to ceramic insulators to ensure the supporting ropes would not influence the tests. A differentially wound ferrite ring was added under the balun to reduce the possibility of RF currents being radiated by the coax feedline.



*The antenna feedpoint was setup for rapid changeovers*

The feedline at both the transmitter and receiver was 7 metres of RG58 coax.

We were now ready to measure some signals.

### **Meet the antenna samples:**

#### **Antenna #1 & #2 – Copper wire**

Perhaps the most common wire used in antennas is copper 'building' wire. This is PVC plastic coated wire, seven strand, 2.5mm. It is the sort of product that most low-current electrical switchboards use. It is reasonably inexpensive and moderately tough.

There is often speculation that the PVC coating on the wire will affect antenna performance. We wanted to put this speculation to the test. Hence two dipoles were made from the same reel, but one had

its PVC coating stripped off, leaving the shiny 7-strand wire fully exposed. The plain copper dipole became Antenna #1 and its PVC coated counterpart became Antenna #2. A third one was made to use as the receiving antenna.



### Antenna #3 – Aluminium wire

We were keen to introduce aluminium into the mix, as there has been much speculation on the suitability of this alloy as an antenna conductor.



Locating a reliable source of aluminium wire was difficult, but the local hardware store stocked 3mm aluminium wire for helping growers to shape Bonsai trees. While it was expensive, it was soft, light, easy to work with and had a thin protective coating to reduce corrosion.

### Antenna #4 – Barbed wire

Some two-strand barbed wire was chosen for this antenna. It is a galvanised high-tensile steel that is tough and had to be

trimmed with bolt-cutters. While there is plenty of it around, it was not the most pleasant wire to work with. It was included in the test to see if its high-tensile characteristic would have any effect at radio frequencies. There have been stories of Amateurs insulating and using boundary fences as radiators.

### Antennas #5 & 6 – Clothesline wire & fencing wire

Both of these were galvanised steel. Wire #5 is a multi-strand wire sold as 'clothesline wire' and is often used as guy wire for masts.



Wire #6 was non-barbed fencing wire, 2mm in diameter. Both types were included to see if there was any measurable difference between multi-core and single core conductors.

### Antenna #7 – Stainless steel cable

Often used for balustrades and shade sails, this stainless-steel cable has a reputation of being tough and weatherproof in harsh environments.



It is a worthwhile addition to the test because of its endurance, particularly in coastal areas and maritime scenarios. We were curious to see how well it would perform at radio frequencies.

#### **Antenna #8 – Garden tie-wire**

This is somewhat similar to fencing wire, except that it is thinner and has a green PVC plastic coating. It is cheap and reasonably easy to work with.



This wire has been included in several antenna construction articles, and its use has attracted some criticism. This was a good opportunity to see if it was as bad as some profess.

#### **Antenna #9 – MIG welding wire**

This type of wire is cheap and plentiful, but it has some issues. It has a solid steel 0.9mm core with a thin copper coating, designed to be used in welding machines. It is very strong, but hard to work with.



In 2016 we used MIG welding wire to make a rhombic antenna for the 40-metre band, spread over 5 acres on top of 12 metre high posts. It seemed to work well at the time, but even after just two weeks in the air there were some signs of surface corrosion. Would the copper coating help at radio frequencies?

#### **Antenna #10 – Overland Telegraph wire**

In 1872 an overland telegraph line was constructed between Adelaide and Darwin, some 3,200km long, through some inhospitable land. Whilst it was a commercial success, it was expensive to use, with each Morse Code word sent costing the equivalent of a day's wages for a labourer.



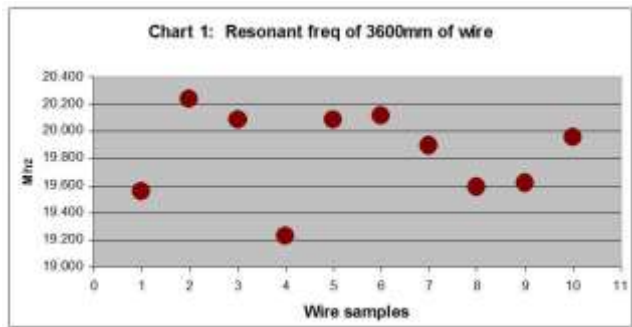
The original path went through Oodnadatta, next to the old Ghan rail route. In 1995 I found long sections of wire laying on the ground between sand dunes, well preserved in the dry climate. I rolled up enough to make a couple of 80 metre dipoles and lashed it to the roof rack.

I had heard stories about steel wire being unsuitable for antennas, so in the end I was reticent to use it. These tests provided the ideal opportunity to see if my concerns were warranted. It is a very stiff, heavily galvanised wire, about 4.5mm in diameter.



Checking for resonance

For these tests, antenna resonance was important. We didn't want results skewed by reflected power from a poorly matched load. We used a SARK110 antenna analyser to check VSWR of each test antenna. The results were surprisingly diverse.



The same antenna lengths (with each conductor type) gave resonant frequencies varying as much as 1 MHz.

Even with the first two samples, removing the PVC coating from the copper wire increased resonant frequency by 700 KHz.

This is an important characteristic for experimenters to note, as it will impact many other antenna designs.

The table below shows the results with each antenna was trimmed to resonance.

| Sample | Antenna material                                | Ideal length (mm) for 21.2 MHz |
|--------|-------------------------------------------------|--------------------------------|
| 1      | Plastic coated copper wire, 2.5sqm, 7 strand    | 3321                           |
| 2      | un-coated copper wire, 2.5sqm, 7 strand         | 3437                           |
| 3      | Aluminium wire, 3mm, with thin paint layer      | 3410                           |
| 4      | Barbed wire, galvanised, 2 strand               | 3265                           |
| 5      | Clothes line wire, steel, galvanised, 7 strand  | 3410                           |
| 6      | Fence wire, 2mm solid steel, galvanised         | 3416                           |
| 7      | Winch cable, stainless steel, 4mm               | 3379                           |
| 8      | PVC coated (green) steel garden wire            | 3326                           |
| 9      | MIG welding wire, copper coated, 0.9mm          | 3331                           |
| 10     | Overland Telegraph wire, gal steel, solid 4.5mm | 3389                           |

These figures worked well and when re-tested, each antenna had a peak resonance centred right on our test frequency.

An important observation here was the variability between copper wire with and without PVC insulation. The metal used in each antenna also affected antenna length,

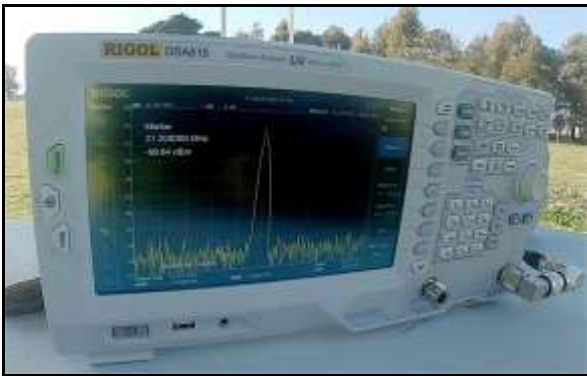
with the biggest difference being 172mm per leg.

The tests

The testing proceeded smoothly, with liaison between the two stations taking place via 2M hand-helds.



The signal generator produced a stable RF signal, easily received and measured with a marker point on the spectrum analyser. These measurements provided clear indicators as to how well each antenna performed under test conditions.



Reception was also checked with an old FT-101 transceiver, as these had an analogue S-meter, but the signals were low and small differences were difficult to discern.

It took about four hours to complete the tests, with the final test looping back to the first antenna to ensure that nothing had changed with the test environment over the course of the day.

The tests were recorded by video and posted to the RASA [You Tube channel](#).



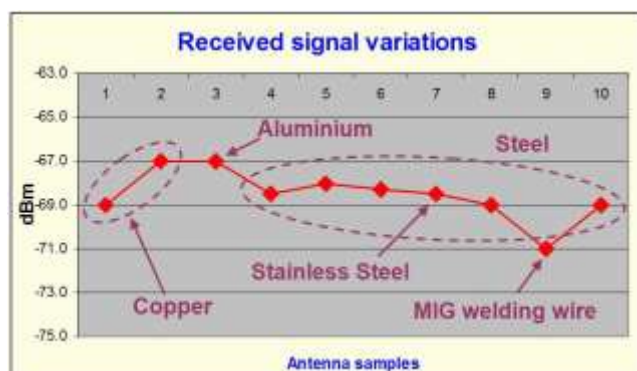
## Conclusions

The findings of these tests may surprise some. Others, who have been using dipoles made from varying materials will be less surprised.



Ian VK3BUF and Chris VK3QB discussing the results

This image shows the variations between all ten wire samples.



The main conclusions were:

1. The type of wire used has only a small effect on the radiated signal strength. With the exception of MIG welding wire, the other nine wire types fell within a 2dBm range. ***That's barely discernible; about one-third of an 'S' point on a regular HF receiver.*** The table below shows the results.
2. The choice of conductor and its insulation will influence the antenna length and feed-point impedance. Removing the PVC insulation from a multi-strand copper cable increased

the resonant frequency by 0.7 MHz and lowered the impedance by 10 ohms.

| Sample | Antenna material                                | RX signal (dBm) |
|--------|-------------------------------------------------|-----------------|
| 1      | Plastic coated copper wire, 2.5sqm, 7 strand    | -69.0           |
| 2      | un-coated copper wire, 2.5sqm, 7 strand         | -67.0           |
| 3      | Aluminium wire, 3mm, with thin paint layer      | -67.0           |
| 4      | Barbed wire, galvanised, 2 strand               | -68.5           |
| 5      | Clothes line wire, steel, galvanised, 7 strand  | -68.0           |
| 6      | Fence wire, 2mm solid steel, galvanised         | -68.3           |
| 7      | Winch cable, stainless steel, 4mm               | -68.5           |
| 8      | PVC coated (green) steel garden wire            | -69.0           |
| 9      | MIG welding wire, copper coated, 0.9mm          | -71.0           |
| 10     | Overland Telegraph wire, gal steel, solid 4.5mm | -69.0           |

*This table shows rx signal strengths as a relative indication in -dBm*

3. Other than adjusting the length to resonance, there is little cause for concern over the type of wire used in a dipole. Effective differences are minor. The cheap galvanised clothes-line wire performed nearly as well as the more expensive copper and aluminium wires. It is more important to focus on other practical characteristics, such as strength, reliability, height, and orientation.
4. **The toughest and most flexible of all the wire tested was the thin stainless-steel cable, making it the best overall choice of antenna wire for all conditions.** (Editor: Anecdotal experience supports this assertion. Many successful HF stations use stainless steel as the preferred material for wire antennas.)

It is important to note that these tests were experimental and hands-on in nature. We were not seeking a specific outcome. Whilst it would have been nice to expand the experiment to include the 40 or 80 metre bands, or try other antenna designs, time and space were limited.

Readers who have conducted similar tests and wish to share their own experiences are invited to do so.

Finally, don't use barbed wire as an antenna. It performs ok, but it's terrible to work with.

(Editor: An alternate study using software EZNEC Pro2 modelling to base its findings, does not recommend the use of Stainless-Steel wire. The article can be found [here](#).)

**Disclaimer:** These tests and findings are presented in good faith. **Your experience may be different.**



Want to see a video of these antenna wire tests? Click the image above to view our YouTube video.

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## Exams and Callsign Administration



Since early 2019, the Australian Maritime College has been providing exams and callsign administration services on behalf of the ACMA.

For more information, visit the [AMC Website](#) and follow the links.

## Training Courses



Looking to get your licence or upgrade? If you are in Perth, contact Ham College for excellence in face-to-face training. Click the image below for more info.



National Online and Remote Training from the Radio & Electronics School. Since 1997. Click the image for more info.

## Contesting

We tend not to focus too much on contesting here at QTC, but we know contesting is an important part of the hobby for many readers. We're in the middle of local contesting season (well, contests run all year around), but we're in-between the highly regarded Remembrance Day Contest and Oceania DX Contest.

### Remembrance Day Contest



This year was very well patronised, and some good scores were recorded. Congratulations to all the placegetters and thanks to all participants who make this local contest the great success that it is. You can view the scores [here](#).

Contest Manager Alan VK4SN tells us:

*"This year was exceptional with bigger logs and more activity by default..."* and Alan also confirms that some mooted rule changes will **not** be proceeding.

Thanks Alan VK4SN for your ongoing commitment to make this a fun and friendly contest.

It would have been nice to see more ops active between 1-6am for bonus points. Maybe next year.

### Oceania DX Contest

## OceaniaDXcontest

News just in from Brian VK3MI:

*"Calling all VK contesters - it's time to get ready for the 76th OCDX contest!"*

*First established in 1934 and earlier known as the VK/ZL contest, the Oceania DX Contest (OCDX) is the only international HF radio contest where beams throughout the world are turned towards Oceania. Please join us again over the first two weekends of October for the 76th running of this epic event.*

*PHONE - 06:00 UTC Saturday 2 Oct to 06:00 UTC Sunday 3 Oct 2021 CW - 06:00 UTC Saturday 9 Oct to 06:00 UTC Sunday 10 Oct 2021"*

So, get to work making your station contest ready and have a go in this international contest. All beams will pointed our way for a change, so it's also a great opportunity to work some new or juicy DX.

Read more [here](#).

## Improving your Morse Code with CW Academy

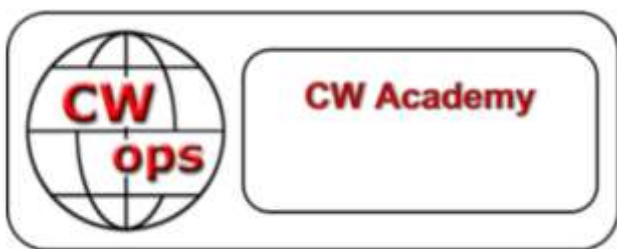
By Chris VK3QB

**L**earning or improving Morse Code is an ongoing battle for many of us. As it is no longer a requirement for attaining an amateur radio licence it has become a skill that people learn by choice.

But... what's the best way to learn and/or improve your Morse Code skill?

I learnt the old-fashioned way with a tape from the WIA. 5WPM... and it was painful. The methods used today are far easier and get you up to speed with greater accuracy and fewer hurdles. A little earlier this year I undertook a course with CW Ops.... A club not unlike FISTS, CW Ops is dedicated to the unique art form of Morse Code. From their web site:

*"Welcome to CWops! We bring together and support amateur radio operators who enjoy communicating by Morse Code (CW). We offer free CW training to those who want to learn this special skill that reaches back to the very beginning of ham radio and remains vital today. Learning and operating CW is fun and you can do it!"*



CW Ops offer CW Academy. CW Academy is a well-structured and delivered training course run over eight weeks. Classes are delivered twice a week via online conferencing facilities (like Zoom, Google Meet, Skype) and a thorough schedule of homework is provided – and expected!

The Advisors (not teachers) are extremely supportive and go the extra mile to keep you on track.

I missed one class and my Advisor phoned me (from America) to make sure I was alright... hint hint, why wasn't I in class.

The classes are very well structured, and the homework expectations are very clear, and achievable. You simply need to commit to 30-60 minutes per day to practice. The coursework includes using computer programs to assist with the learning process, and they're also fun.

If you really are serious about wanting to learn the code, or improve your code, I cannot recommend CW Academy highly enough. But you will need to commit yourself to the program. Make no mistake, this means eight weeks of dedication to attending classes twice a week and doing the homework.

If you want to learn more about CW Academy, click this link or email me for more information.

[www.cwops.org/cw-academy](http://www.cwops.org/cw-academy)





## *Welcome Packs: Free resources for Clubs*

**Does your club run training courses or exams for newcomers? If so, read on...**

RASA has put together a free **Amateur Radio Welcome Pack**. These packs comprise a portfolio folder which includes a number of useful documents and reference sheets.

Give your students some practical and relevant material to take away at the end of the course.

Included in this **Welcome Pack** are some documents and information sheets to help your students get started.



- Welcome to Amateur Radio Guide Book
- VK Regulations Handbook
- Getting started with Repeaters
- Australian Band Plan Quick Reference Guide
- Interference Resolution (QRM) Process Guide
- Useful Web sites information sheet

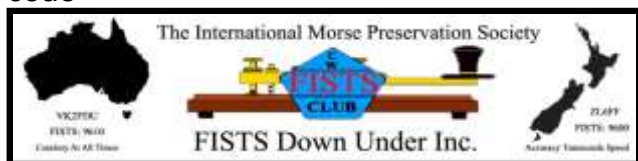
If your club is running a course and would like to provide these resources to your students just send us an email. This is a free resource. We only ask that you cover postage costs.

Have your Club President email us at [info@vkradioamateurs.org](mailto:info@vkradioamateurs.org)

## National Special Interest Groups

Links to VK national groups with a brief explanation of their activities. Click on the image to visit their web site.

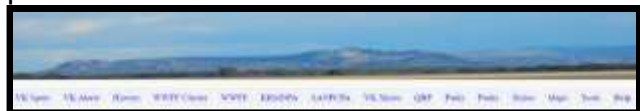
**Morse code** – VK/ZL site all about the code



**VK QRP Club** – low power operation



**Parks n Peaks** – all about operating portable



**VK Contest Club** – VK Contesting



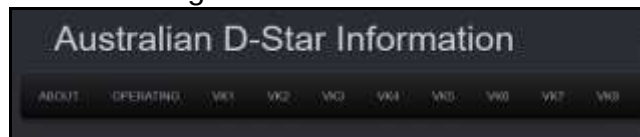
**QRM Guru** – resolving interference



**VK DMR Network** – Australia's largest digital radio network



**D-Star** – Digital Radio



**RAOTC** – for amateurs licenced 25 years or more



**ALARA** – Ladies Amateur Radio Association



If you see we've overlooked something,  
please send us an email  
[info@vkradioamateurs.org](mailto:info@vkradioamateurs.org)  
please send us an email  
[editor@qtcmag.com](mailto:editor@qtcmag.com)

## VK Suppliers of AR Products



Neither RASA nor QTC Mag endorse or have any affiliation with suppliers on this list.